DOCUMENT RESUME

ED 388 231 IR 017 380

AUTHOR Chen, Der-Thanq
TITLE Standardizing "HyperVocabulary": A Proposal.
PUB DATE 94
NOTE 7p.; In: Educational Multimedia and Hypermedia, 1994. Proceedings of ED-MEDIA 94--World Conference on Educational Multimedia and Hypermedia (Vancouver, British Columbia, Canada, June 25-30, 1994); see IR 017 359.
PUB TYPE Reports - Evaluative/Feasibility (142) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Definitions; Electronic Text; *Hypermedia; Multimedia Materials; Standards; *Vocabulary

ABSTRACT

Vocabulary used to describe things that are "hyper" is very confusing. This paper discusses four factor which contribute to the confusion: the same idea is often described using different terms; even though people sometimes use the same terms, quite often they are referring to different ideas; people tend to confuse "hyperdocuments" with electronic documents; and the relationship among definitions of the vocabulary is often inconsistent. In addition, a set of standardized definitions is proposed. They include: (1) (sequential) text: documents presenting text to be used in a sequential manner; (2) hypertext: documents presenting text to be used in a nonsequential and/or sequential manner; (3) multimedia: documents presenting media to be used in a sequential manner; and (4) hypermedia: documents presenting media to be used in a nonsequential and/or sequential manner. The establishment of these definitions is based on three characteristics of documents: linearity, modality, and singularity. The three characteristics reflect the use of the terms "hyper," "medium," and "multi," respectively. Examples and comparisons of different types of documents are discussed. Four figures illustrate concepts. (Contains 12 references.)
(Author/MAS)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 388 231

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Gary H. Marks

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Standardizing "HyperVocabulary:" A Proposal

DER-THANQ CHEN
Center for Electronic Studying, College of Education
University of Oregon, Eugene, OR 97403-1215, USA
E-Mail: derthanq@oregon.uoregon.edu

Abstract: Vocabulary used to describe things that are "hyper" is very confusing. This paper discusses four factors which contribute to the confusion. In addition, a set of standardized definitions is proposed. They include: (a) (sequential) text: documents presenting text to be used in a sequential manner, (b) hypertext: documents presenting text to be used in a nonsequential and/or sequential manner, (c) multimedia: documents presenting media to be used in a sequential manner, and (d) hypermedia: documents presenting media to be used in a nonsequential and/or sequential manner. The establishment of these definitions is based on three characteristics of documents: (a) linearity, (b) modality, and (c) singularity. The three characteristics reflect the use of the terms "hyper," "medium," and "multi" respectively. Examples and comparisons of different types of documents are discussed.

The field of hypertext/hypermedia has a communication problem. The vocabulary used to define things that are "hyper" is both confusing and ill-defined. At least four factors contribute to this confusion. They are: (a) similar ideas are described using different terms; (b) the same term is used to describe different ideas; (c) "hyperdocuments" are often confused with electronic documents; and (d) there is inconsistency among definitions of "hypervocabulary". Discussions of each of the factors are presented below.

First, the same idea is often described using different terms. For example, Field (1990) introduced an inexpensive approach to using hypermedia in regular classrooms. In her article, she used the terms "hypermedia" and "interactive multimedia" interchangeably and without defining them. It reads as if multimedia and hypermedia are identical. Similarly, Smith and Westhoff (1992) described the Taliesin Project as a "multimedia project" which includes a "hypermedia delivery system" as the underlying host. They did not, however, clarify the distinction between the terms. Neglecting to provide comparisons among similar terms usually leaves meaning open to interpretation.

Second, even though people sometimes use the same terms, quite often they are referring to different ideas. For example, Conklin (1987) and Marmion (1990) defined hypertext as consisting of nodes of text and links among the nodes. Links are logical connections among nodes. Horney (1991), expanded this node-and-link metaphor a step further. Based on Nelson's (1987) definition, he suggested that hypertext not only includes nodes and links, but also presents information in a way that users are free to choose what to read next. He argued that a key element of hypertext is freedom of choice. Clearly, Horney's use of the term "hypertext" is somewhat different from that of Conklin or Marmion.

Third, people tend to confuse "hyperdocuments" with electronic documents. For example, Bonest (1991) suggested that one of the disadvantages of hypertext is the problem of "tunnel vision;" i.e., readers' vision is limited by the size of the computer screen. However, this is true only if the hypertext system is presented through a computer. Some researchers (e.g., Chen, 1989; Marmion, 1990) have argued that hypertext can also exist on paper. Including tunnel vision as one of the disadvantages of "hyperdocuments" seems to be an overgeneralization.

Fourth, the relationships among definitions of the vocabulary are often inconsistent. For example, Woodhead (1991) suggests that hypertext is a subset of hypermedia, which is a subset of interactive multimedia. He restricted the use of hypertext for text-based documents only. However, later in his book the term multimedia is used to describe documents involving more than one medium. If this is true, how can hypertext

IR017380

BEST COPY AVAILABLE

be a subset of multimedia? They should be two distinct sets, because hypertext, by Woodhead's definition, includes only one medium, text.

In short, there is a communication problem in this field. I strongly feel the need to propose a set of standardized definitions. In this paper, I define four of the most commonly used terms: (sequential) text, hypertext, hypermedia, and multimedia. By defining these terms, making comparisons among them, and providing real world examples, I hope that we can establish a common ground on which to stand and from which we may communicate more effectively and efficiently.

The Proposed Definitions

The proposed definitions are listed below. Detailed discussion and examples will be presented in succeeding sections. Note that I am using the words "sequential" and "linear" interchangeably. The term "sequential text" is the same as the term "text" in the context of "hypervocabulary."

(Sequential) Text: documents presenting text to be used in a sequential manner.

Hypertext: documents presenting text to be used in a nonsequential and/or sequential manner.

Multimedia: documents presenting media to be used in a sequential manner.

Hypermedia: documents presenting media to be used in a nonsequential and/or sequential manner.

Here, I dedicate the definitions of "hypervocabulary" to describing types of documents. These definitions do not include the programs or systems which hold or produce the documents. Nor do they refer to constructs such as nonlinearity or to the manner in which the documents are used. When referring to these systems, I will use "hypertext systems" or "multimedia systems." When referring to constructs, I will use the "idea" or "concept" of hypermedia. Therefore, "hypertext documents" means the same as "hypertext" based on the proposed definitions. Furthermore, the word "document" is taken as a token which means any container of information. A document can be either electronic or nonelectronic.

Additionally, I would like to distinguish between an author's intention and the user's reading strategies. It is the author's intention, not the user's, which determines the characteristics (e.g., linear or nonlinear) of a document. Any document can be linear or nonlinear, if the definitions are based on the reader's use. For example, a naive reader might decide to read an encyclopedia from the first page to the last, even though the encyclopedia was originally designed to be read nonlinearly. Similarly, an expert reader usually reads a book nonlinearly by referring back and forth among different pages, even though a book was usually written to be read linearly. To avoid unnecessary confusion, the proposed definitions are based on how documents are designed to be read, but not how users read. More discussions will be presented later.

Linearity, Modality and Singularity

To discuss the proposed definitions, I have chosen to start from describing three characteristics of documents: linearity, modality, and singularity. The three characteristics are meant to reflect ideas of "hyper," "medium," and "multi" respectively. Their relationships are shown in Figure 1.

Linearity indicates whether or not a document is organized in a linear manner. Conventional books, for example, were written with the expectation that readers read them in a linear manner. Mystery books, in particular, do not expect readers to read the ending first (although many of them do). It is expected that readers will enjoy guessing the ending by reading the books linearly. On the other hand, a dictionary, is designed to be read in a nonlinear manner. The definition of each word in a dictionary can be considered a node. Although these nodes are in an alphabetical order, users of a dictionary do not read the definitions in an alphabetic, i.e. linear, order. Users of a dictionary look up words by going directly to a particular page at the appropriate spot in the alphabet. They do *not* read the dictionary from the beginning to the end. Furthermore, when encountering an unfamiliar word in a definition, users often go to the page that defines the unfamiliar word. An experienced dictionary user usually jumps back and forth among several pages to check the meaning of different words. In this case, a dictionary is designed to be used nonlinearly, and the actual links are constructed by the reader in real time.

Modality characterizes the type of media included in a document. For example, a document of sounds has a different modality from a document of graphics. A document with video has a different modality from a document without video. As will be discussed later, modality, in this proposal, is used to distinguish documents with text from documents without text.

Singularity describes the number of media involved in a document. If a document includes only one medium, it is singular. If more than one medium (at least two) is included in a document, it is not singular. Thus, singularity can be used to describe the distinction between text and multimedia. Text includes only one medium, whereas multimedia implies the involvement of mixed media such as sounds and pictures.

Among these three characteristics, the concept of linearity is the most controversial. When defining the terms hypertext and hypermedia, people tend to emphasize their nonlinearity, giving the impression that nonlinearity is the only characteristic of "hyperdocuments." In fact, "hyperdocuments" include nonlinear as well as linear characteristics. This is very clearly indicated by Nelson (1987), when he says that "hypertext can include sequential text, and is thus the most general form of writing" (p. 0/3). In other words, hypertext is the union of linear text and nonlinear text.

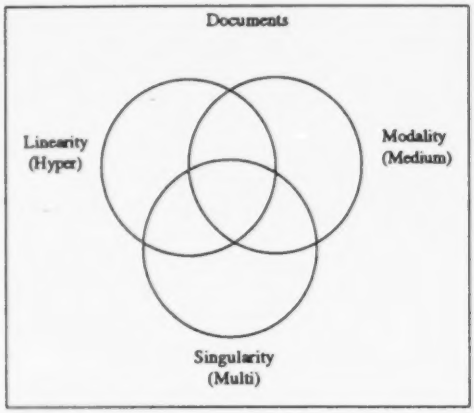

Figure 1. Linearity, modality and singularity characteristics of documents

A good example of this relationship is provided in the book *Literary Machines* (Nelson, 1987). *Literary Machines* is organized into one Chapter Zero, several Chapters One, one Chapter Two, several Chapters Three, several Chapters Four, and several Chapters Five. Nelson suggests that the reader read Chapter Zero and one of the Chapters One, and then Chapter Two, the heart of the book. "Because Chapter Two is long and sequential, its parts are numbered. Other sections of this book are not numbered because they are not, in principle, sequential" (p. 0/3). Nelson suggests that the reader then read one of the closing chapters. Chapters Four and Chapters Five are particularly nonsequential; readers are encouraged to read in whatever order they prefer. Readers are also encouraged to read the book several times, taking a different path each time. *Literary Machines* exemplifies both the linear and nonlinear characteristics of hypertext, and provides a concrete example that hypertext is a superset of sequential text.

In the same way that hypertext is the most general form of writing, hypermedia can be considered the most general form of media. That is, hypermedia can include sequential media and nonsequential media. In other words, hypermedia is the union of linear media and nonlinear media. Because the linguistic structure of the word "multimedia" does not imply the possession of nonlinear characteristics, it is best used to describe linear media only. Therefore, multimedia is a subset of hypermedia.

A Closer Examination

Using the characteristics of linearity, modality and singularity, eight types of documents can be derived. They include: (a) nonlinear nontextual medium, (b) linear textual medium, (c) linear media without text, (d) nonlinear textual medium, (e) nonlinear media without text, (f) linear media with text, (g) nonlinear media with text, and (h) linear nontextual medium. Their relationships are illustrated in Figure 2.

Area A is nonlinear nontextual medium. For example, the program "Inigo Gets Out" (Goodenough, 1987) is a pictorial story presented in a nonlinear manner. The main character "Inigo" of the story is a cat. The reader plays the role of Inigo and decides what to go next throughout the journey of its adventure. The reader can literally read the story several times without repeating the same path. "Inigo Gets Out" is nonlinear and nontextual, and singular, involving only the medium of picture. There is currently no accepted term for a document with these characteristics. To be consistent, the term "hypermedium" is a possible descriptor.

Area B is linear textual medium. As mentioned above, a mystery book involves only the text medium and is presented in a linear fashion. It is textual and singular. Therefore, it falls into this area. A document with these characteristics should be called "text."

Area C is linear media without text. Although most existing documents involve text, there are some that do not have text in them. For example, a video tape program usually involves sounds and moving pictures. But the users (audiences) normally only access it in a sequential manner, playing it from the beginning to the end. It is linear and not singular. No text is involved. A document with these characteristics should be called "multimedia."

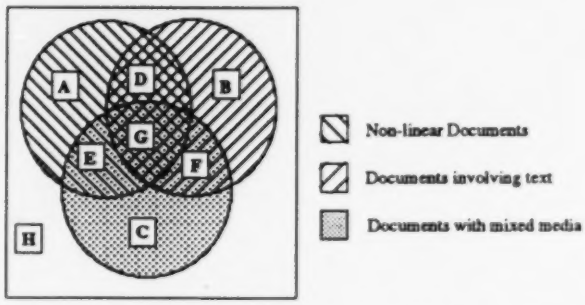

Figure 2. Eight types of documents derived from the three characteristics

Area D is nonlinear textual medium. Again, as mentioned above, a dictionary is nonlinear and is mainly textual. Only one single medium, text, is involved. A document with these characteristics should be called "hypertext."

Area E is nonlinear media without text. For example, when a video program is divided into segments and is put on a laserdisc, it becomes accessible by the user in a nonsequential manner. The user can choose which segment and which order of video clips to examine. No text is involved. It is nonlinear and not singular (includes both motion pictures and sounds). A document with these characteristics should be called "hypermedia."

Area F is linear media with text. When watching a foreign movie, we may need the text captions to understand the film. A captioned film is still linear, but is not singular. It now includes text. A document with these characteristics should also be called "multimedia."

Area G is nonlinear media with text. For example, a CD-ROM encyclopedia falls into this category. An electronic encyclopedia usually has text, sounds and pictures. It can be accessed in many possible orders. One of the media involved is text. Therefore, it is nonlinear, not singular and involving text. A document with these characteristics should also be called "hypermedia."

Area H is linear nontextual medium. An audio type, for example, falls into this area. Music recorded in a type is to be listened linearly. It involves only one single medium, sound and it is nontextual. There is currently no accepted term for a document with these characteristics. To be consistent, the term "monomedium" is a possible descriptor.

Table 1 summarizes characteristics and examples of different tapes of documents.

Summary

In summary, based on the above discussion, the proposed definitions for a "hypervocabulary" convey the following statements:

- Text, hypertext, hypermedia, and multimedia are types of documents.
- Hypertext and hypermedia exist in both electronic and other media forms.
- Hypertext is a superset of text.
- Hypermedia is a superset of multimedia.
- Text and multimedia are two distinct sets.
- Hypermedia and hypertext are two distinct sets.

The relationships among text, hypertext, multimedia and hypermedia can be represented in Figure 3. A simplified version of this figure is shown in Figure 4.

One of the things I like about the proposed definitions is that now we are ready to invent new terms without adding confusion to "hypervocabulary." The relationships presented in Figure 2 apply to different media.

Theoretically, we shall have "hypersound," "hypervideo," "hyperpicture," and so on. Any combination of the above (including hypertext) will make a document hypermedia. How to draw the relationships among these terms, as a general strategy used by many textbooks, will be left as an exercise for the readers.

Table 1. Summary of types of documents in Figure 2

Area	Linear	Textual	Singular	Description	Example	Vocabulary
A	No	No	Yes	Nonlinear nontextual medium	"Inigo Gets Out"	Hypermedium
B	Yes	Yes	Yes	Linear textual medium	Mystery books	Text
C	Yes	No	No	Linear media without text	Video without text caption	Multimedia
D	No	Yes	Yes	Nonlinear textual medium	Dictionaries	Hypertext
E	No	No	No	Nonlinear media without text	Laserdiscs of sounds and pictures	Hypermedia
F	Yes	Yes	No	Linear media with text	Video with text caption	Multimedia
G	No	Yes	No	Nonlinear media with text	CD-ROM encyclopedia	Hypermedia
H	Yes	No	Yes	Linear nontextual medium	Audio tapes	Monomedium

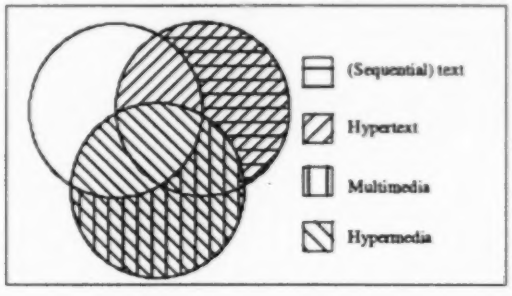

Figure 3. Relationships among text, hypertext, multimedia and hypermedia

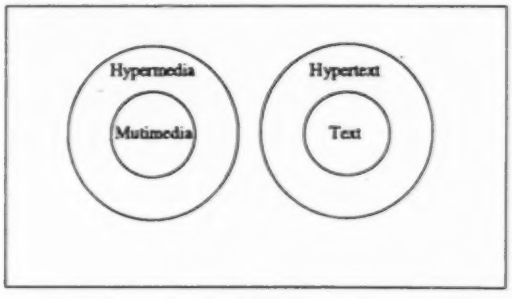

Figure 4. A simplified version of Figure 3

References

Bonest, I. D. (November, 1991). An alternative approach to hypertext. *Educational and Training Technology International, 28*(4), 341-346.

Chen, C. (1989). As we may think: thriving in the HyperWeb environment. *Microcomputers for Information Management, 6*(2), 77-79, 81-97.

Conklin, J. (1987, September). Hypertext: an introduction and survey. *Computer*, 17-41.

Field, C. E. (1990). Exploring hypermedia. *inCider, 8*(1),36-44.

Goodenough, A. (1987). *Amanda stories* [Computer program]. Santa Monica, CA: Voyager.

Hanfling, S. S. (1990, February). *Hypermedia and instruction: Remembrance of lessons past.* Paper presented at the AECT National Convention Workshop, Alexandria, VA.

Horney, M. A. (1991). *Case studies of authoring in hypertext.* Unpublished doctoral dissertation, University of Oregon, Eugene, OR.

Marmion, D. (1990, June). Hypertext link to the future. *Computers in Library, 10*(6), 7-9.

Nelson, T. H. (1965). A File Structure for the Complex, the Changing and the Indeterminate. In *Association for Computing Machinery Proceedings of the 20th National Conference* (pp. 84-100). New York: Association for Computing Machinery.

Nelson, T. H. (1987). *Literary Machine.* South Bend, IN: The Distributors.

Smith, E. E. & Westhoff, G. M. (1992, January). The Taliensin project: multidisciplinary education and multimedia. *Educational Technology, 32*(1),15-23.

Woodhead, N. (1991). *Hypertext and Hypermedia: Theory and Applications.* Wilmslow, England: Sigma.